

# SOFTWARE-DEFINED VEHICLE

## SDV



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VIVEK BHAN

SVP AND GM OF HIGH PERFORMANCE COMPUTING

RENESAS ELECTRONICS CORPORATION

# AGENDA



SDV evolution, market adoption, and trends

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SDV at a glance

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Market growth drivers

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Renesas journey going forward: from semiconductor to systems

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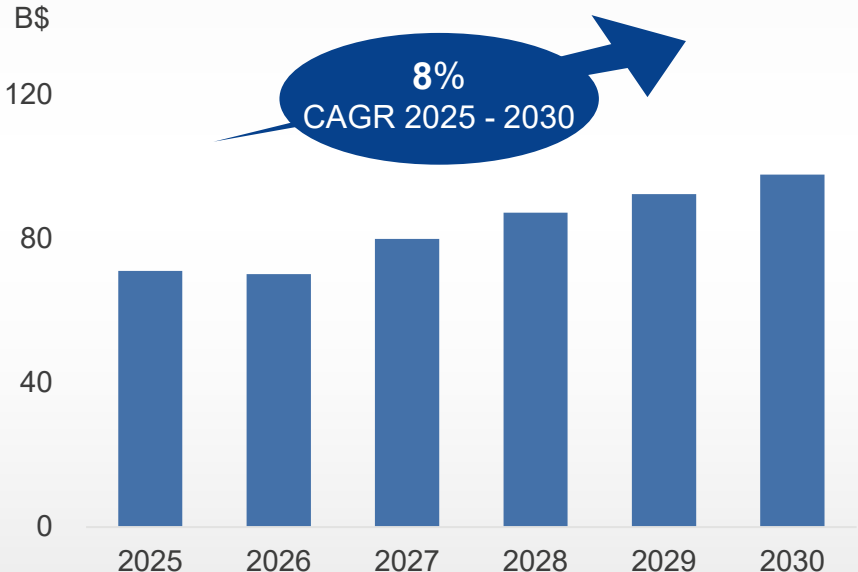
Summary

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# SEMICONDUCTOR GROWTH AND SDV ADOPTION

- **SDV becoming mainstream:** by 2030, >50% of new vehicles globally are expected to be software-defined
- **Semiconductor content:** automotive semiconductor projected growth 7-8% CAGR

Auto semi market<sup>1</sup>

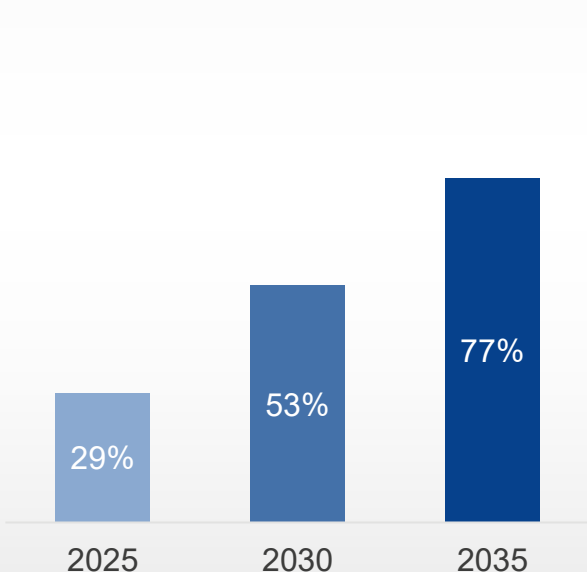


Multi-supplier requirement



Market needs diverse suppliers for SDV solution

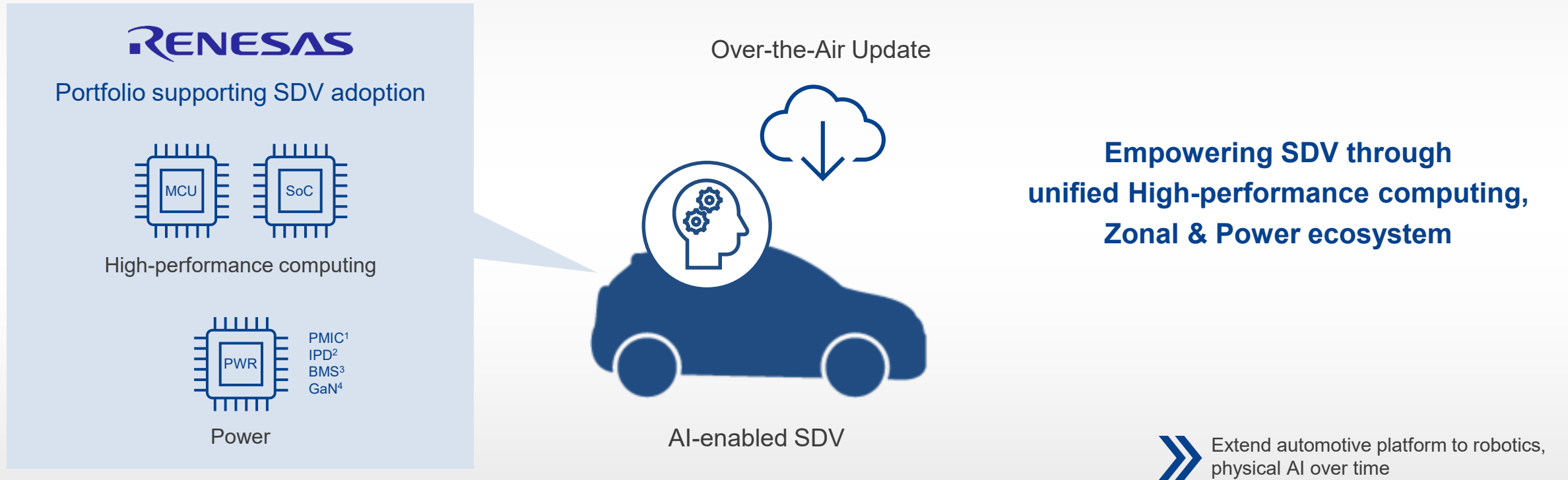
SDV adoption trajectory<sup>2</sup>



1. TechInsights 2026 June, SAM (excl DRAM, Flash) 2. Renesas estimate based on multiple third-party sources

# AI-ENABLED SOFTWARE-DEFINED VEHICLE

- SDV demands **upgradable and adaptable** automotive platform combined with **AI** technology and **software stacks**
- **Renesas's growth pillars:** Central computing with AI (**SoC**), zonal compute (**MCU**), **Power**, **Renesas 365** solutions

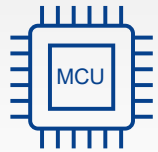


1. Power Management IC 2. Intelligent Power Device 3. Battery Management System 4. Gallium Nitride

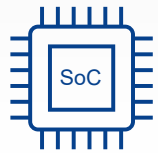
# AT A GLANCE

## SOFTWARE-DEFINED VEHICLE

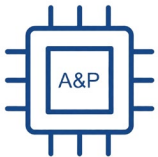
### Products



High-performance, ultra-low power 32bit automotive MCU family with proprietary RH850 and standard cores (Arm)



High performance, high efficiency R-Car SoC for automotive



High accuracy, high-efficiency Analog and Power

### Technologies



Chiplet



Real-time Control



Heterogeneous compute



Safety



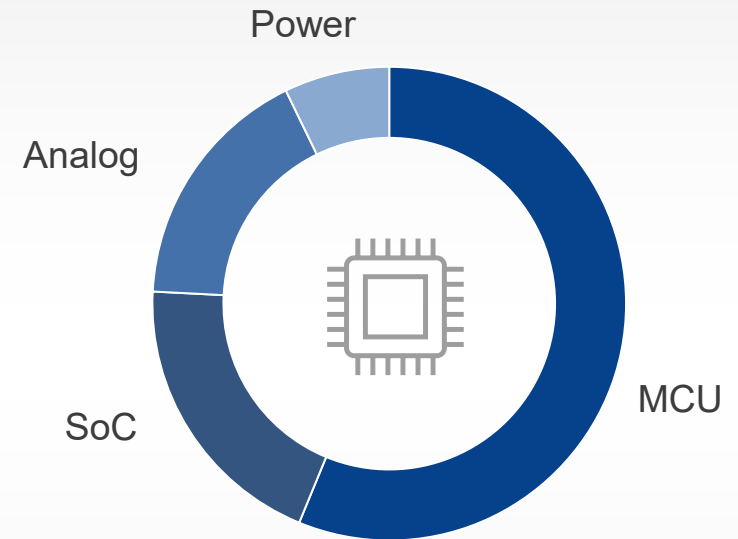
RoX<sup>1</sup> SW platform



Low power

1. R-Car Open Access

### 2025 Revenue mix



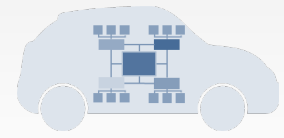
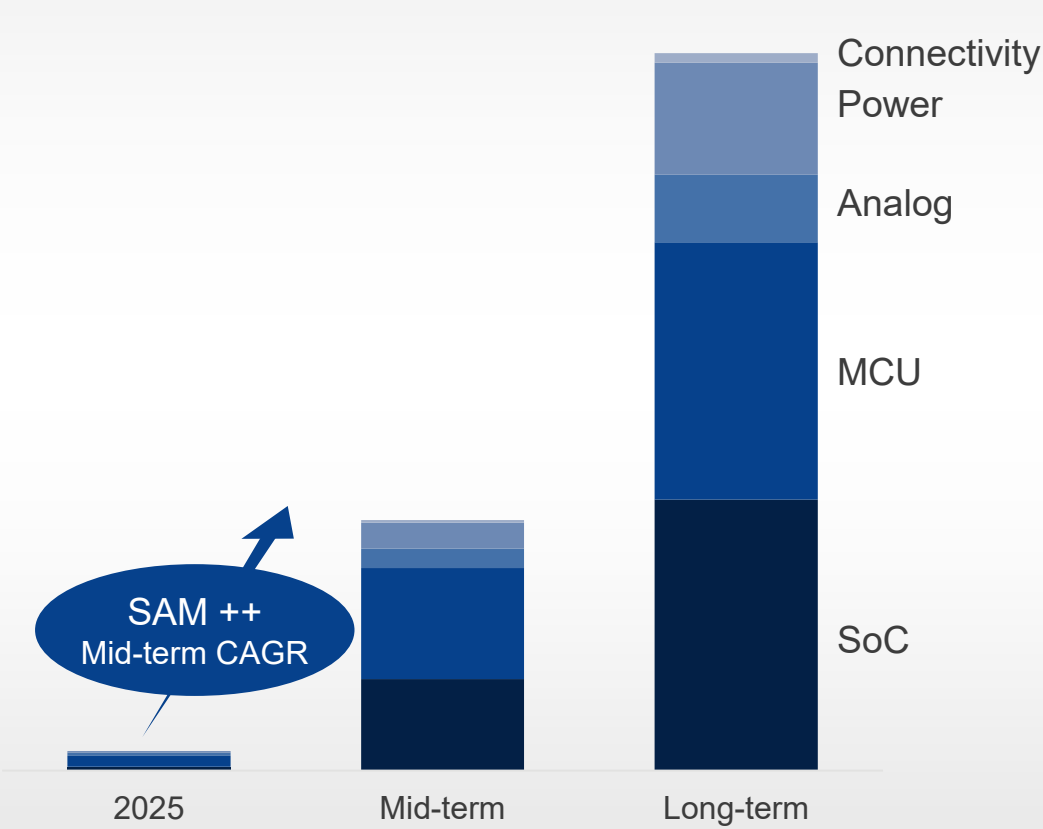
Only major automotive supplier offering both MCU, SoC, Analog and Power capability

# GROWTH DRIVERS

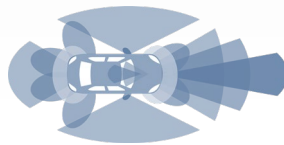
## SOFTWARE-DEFINED VEHICLE

### Revenue

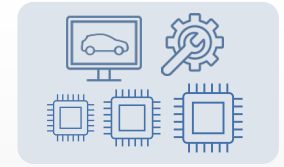
### Foundational growth drivers



**E/E architecture shift:** distributed to centralized compute with zonal architectures increasing semiconductor and software content per vehicle



**ADAS:** rising L2+/L3 requirements drive demand for scalable, high-performance compute and safety-ready architectures



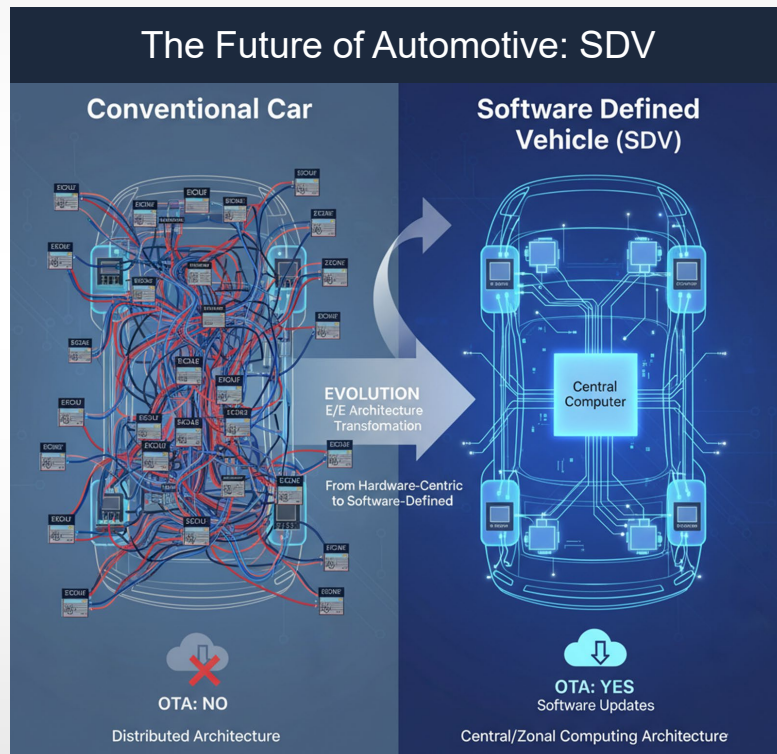
**Platformization:** expanding beyond hardware to software-enabled platform (tools, middleware, security) for value capture, flexibility and scalability



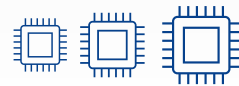
**Ecosystem:** building and expanding the ecosystem with partners to offer optimized solutions to the market

# AUTOMOTIVE E/E ARCHITECTURE EVOLUTION

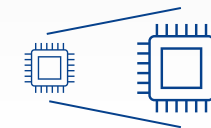
- **Renesas unique position** addressing OEM compute architectures covering centralization and distributed
- **Renesas scalable and flexibility** full range of solutions to OEMs covering their own unique needs and differentiation



## Differentiation for OEMs



RH850 and Standard core



From dozen to 2,000 TOPS<sup>1</sup>



- Large MCU portfolio
- From low to high-end
- Cross over MCUs
- Proprietary & standard cores offering
- Scalable PMIC portfolio

- Scalable SoC portfolio
- Chiplet extension
- Functional safety
- Security & power
- Use-case optimized

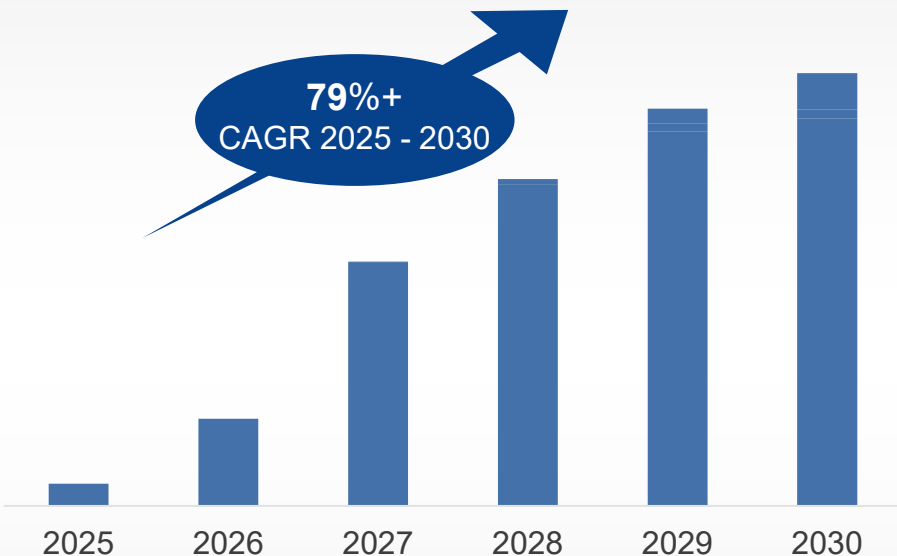
- Core SW, frameworks
- Partners integration
- Shift-left & tools
- Emulation, simulations

Renesas' SDV ecosystem including **MCU, SoC & Power** will drive AI-enabled SDV evolution requiring high-performance zonal & computing

1. Tera Operations per Second

# R-CAR SOC: REVENUE AND ENGAGEMENTS

R-Car Gen4 revenue



## R-Car Gen4 – Japan & global footprint





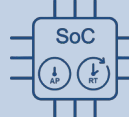

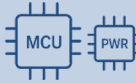


On the road today at key Japanese OEM  
Production beyond Japanese OEMs in 2026

R-Car Gen5 market traction

OEM	<b>1</b> Announced partnership	<b>3+</b> Active RFQ exchange	
	Tier1	<b>6</b> Proof of concept platform	<b>12+</b> Active collaborations
	Ecosystem	<b>5+</b> Application stacks porting	<b>15+</b> Active technology engagement

# RENESAS DIFFERENTIATION

- As **SDV adoption evolves**, Renesas offers value, credible choice, scalability across vehicle architectures

OEM care abouts	Closed-approach competitors	RENESAS	General-purpose approach competitors
SDV transition	Top-down, centralized	 Centralized  Distributed	Not scalable across fleet
Platform openness	Closed and rigid	 Open  Heterogeneous	High flexibility
Portfolio scope	SoC-specific	 Best low latency  System power efficiency 	Non-optimal performance
Architecture	Reuse from mobile / non-flexible hard-coded	 Tj <sup>1</sup> 125°C  Safety & HW-based FFI <sup>2</sup>	Derivate from super-computer

- Hardware-enforced isolation, minimal hypervisor load** for safe, deterministic **mixed critical workload** execution applications
- Flexibility with Optimal Performance** for evolving requirements towards L3/L4 and end to end AI

1. Tj: Transistor junction temperature 2. Freedom From Interference

# PATH FORWARD: PIVOT TO SOFTWARE-DEFINED VEHICLE

## Industry challenges



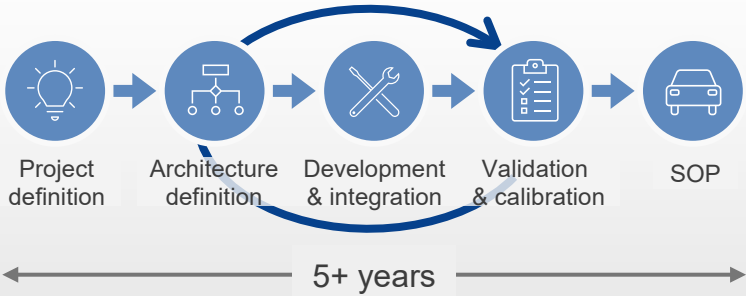
Multi-year SoC development cycle from concept to SOP



Architecture evolution to keep pace with growing AI complexity



Pressure to reduce time to market, cost and complexity



## How to address



Proactive product definition with closer OEM collaboration



Pre-validated hardware & software platform with stacks



System validation driven by OEM use cases



Harmonized compute and power platform



## Results for OEMs



Accelerated SOP launch with lower complexity



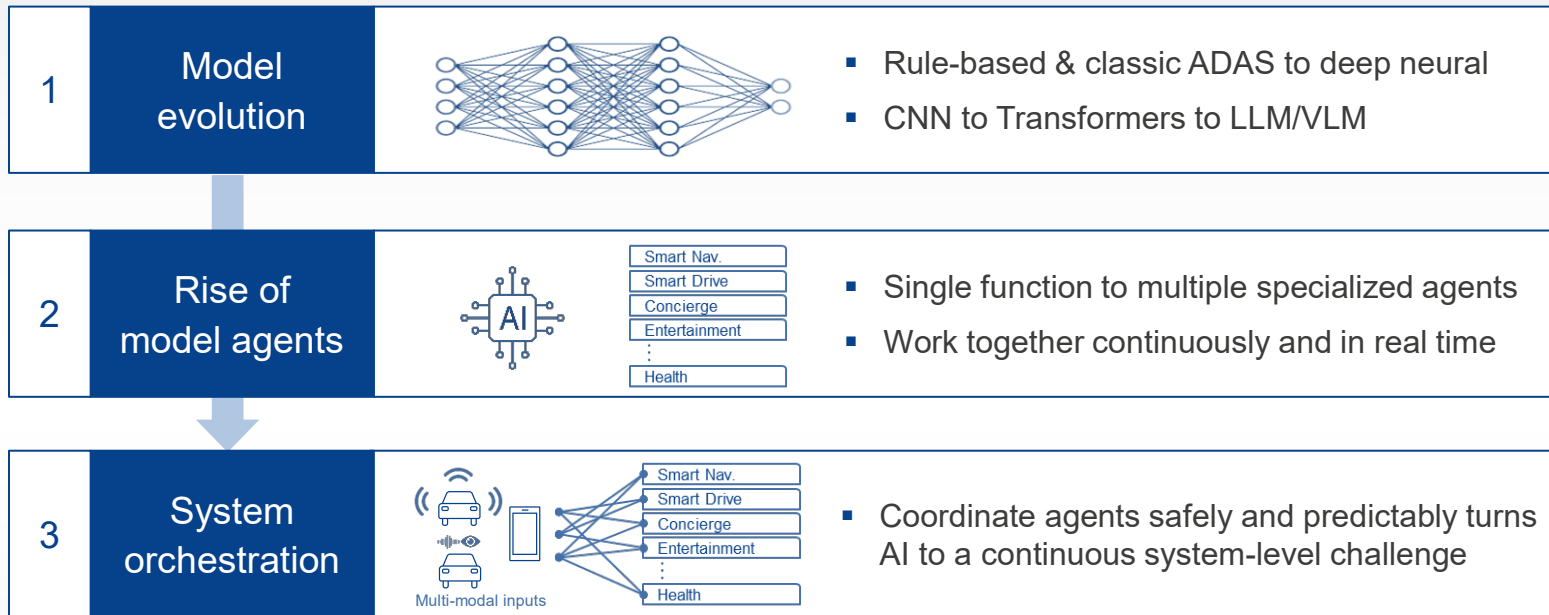
Capability to upgrade hardware & software over production



Better adapt to future market dynamics

# AI EVOLUTION AND RENESAS

- R-Car SoC supports AI evolution from specific AI models, to broader agents, to system orchestration of diverse AI



## SoC must-haves

Go beyond raw TOPS and TOPS/Watt

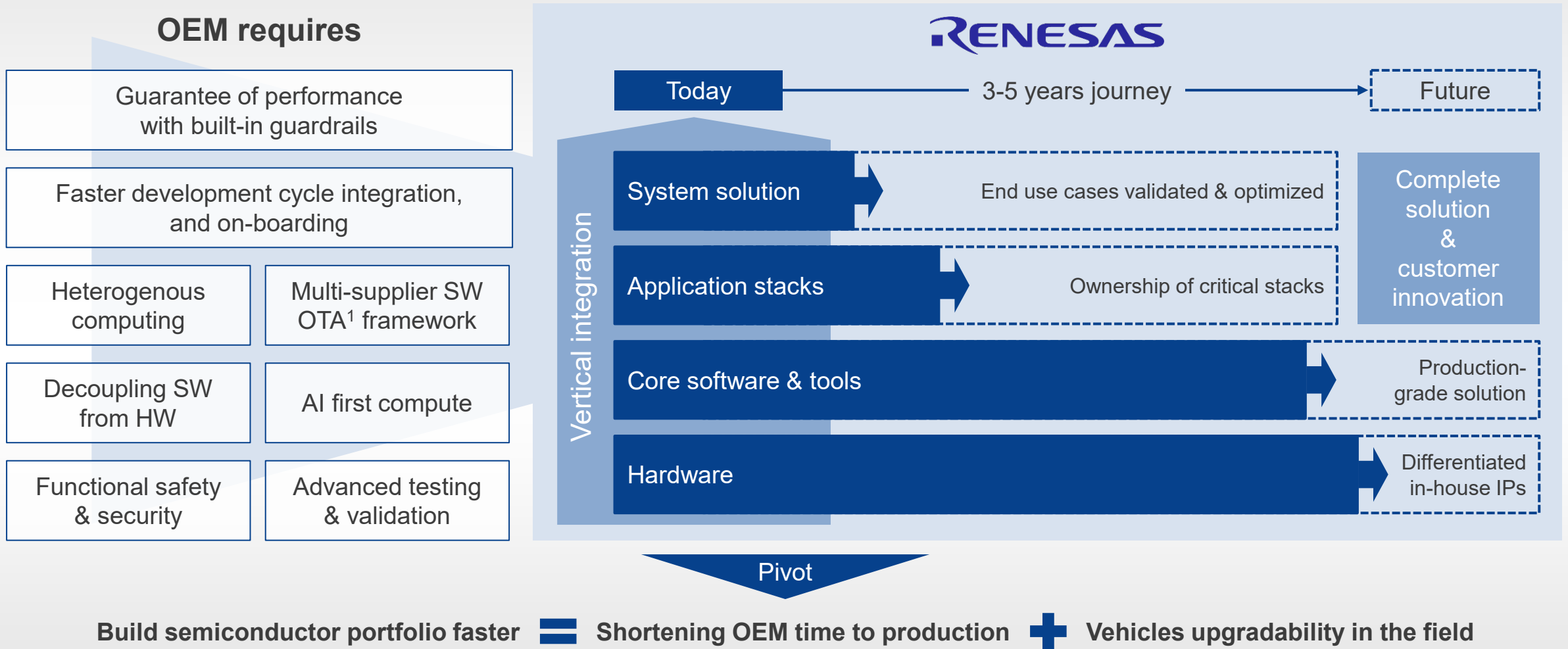
Concurrent heterogeneous compute (CPU, NPU<sup>1</sup>, GPU etc.)

Hard guarantees on latency, safety, isolation & power efficiency

R-Car scalable architecture with **built-in safety** and **freedom-from-interference** isolation, **power efficiency**, low-latency **real-time** performance and **flexible chiplet combos** supporting orchestration of **multiple AI workloads** over long vehicle lifecycle

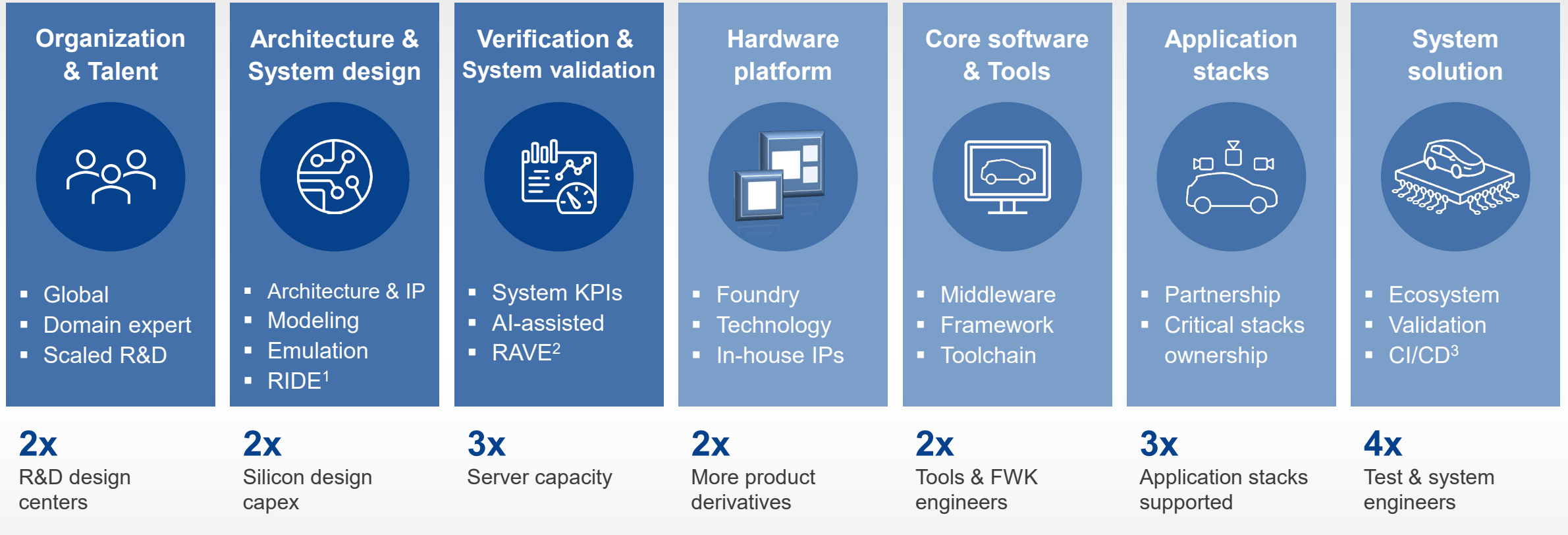
1. Neural network Processing Unit

# REALIZING RENESAS JOURNEY



1. Over The Air

# SDV PLATFORM FOUNDATIONAL PILLARS

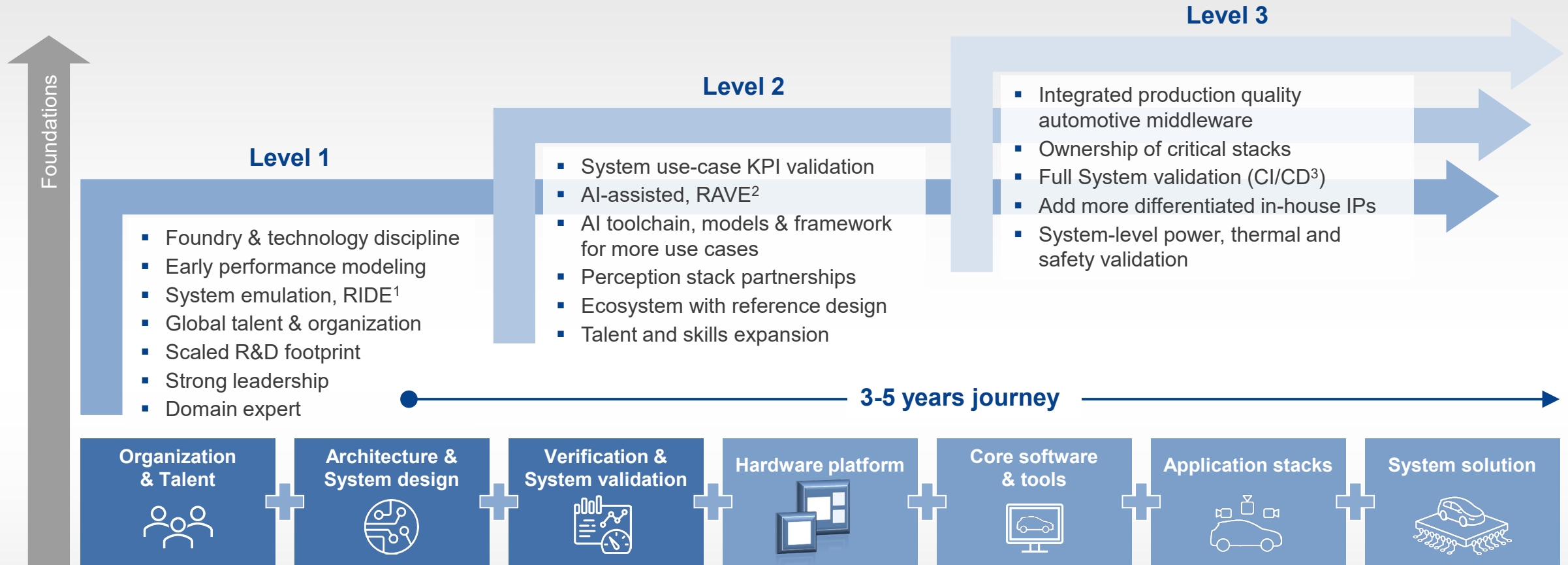


**Pivot to predictable, high-quality, time-optimized development cycle**

**Pivot to vertically integrated platform, accelerated product definition and customer programs launch**

1. Renesas Integrated Design Environment 2. Renesas Automated Verification Environment 3. Continuous Integration/Continuous Deployment

# SDV PLATFORM FOUNDATIONS



**Deliver a predictable, high-quality, and capital-efficient system platform spanning central SoCs and zonal MCUs, with flexibility, and enabling sustained SDV and AI growth**

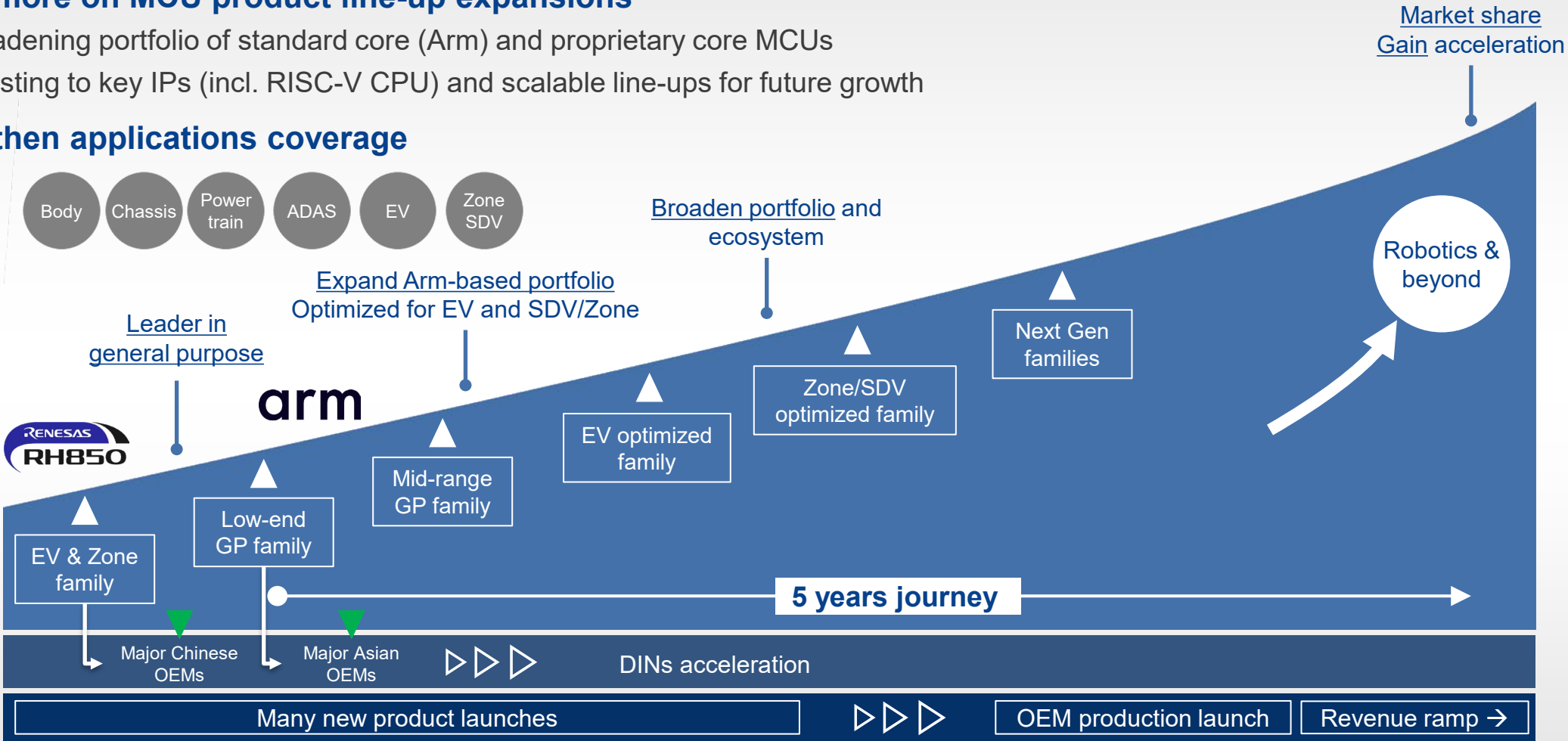
1. Renesas Integrated Design Environment 2. Renesas Automated Verification Environment 3. Continuous Integration/Continuous Deployment

# MCU PORTFOLIO EXPANSION AND MARKET GAIN

## Invest more on MCU product line-up expansions

- Broadening portfolio of standard core (Arm) and proprietary core MCUs
- Investing to key IPs (incl. RISC-V CPU) and scalable line-ups for future growth

## Strengthen applications coverage

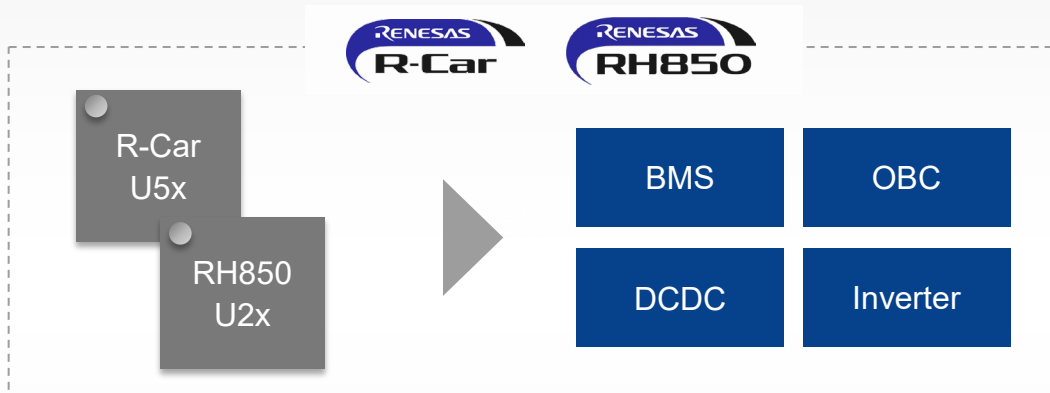


# GROWING IN SDV WITH OPTIMIZED EV MCUS

## Growing in EV today

### Expanded EV MCU Portfolio

- Broad system coverage



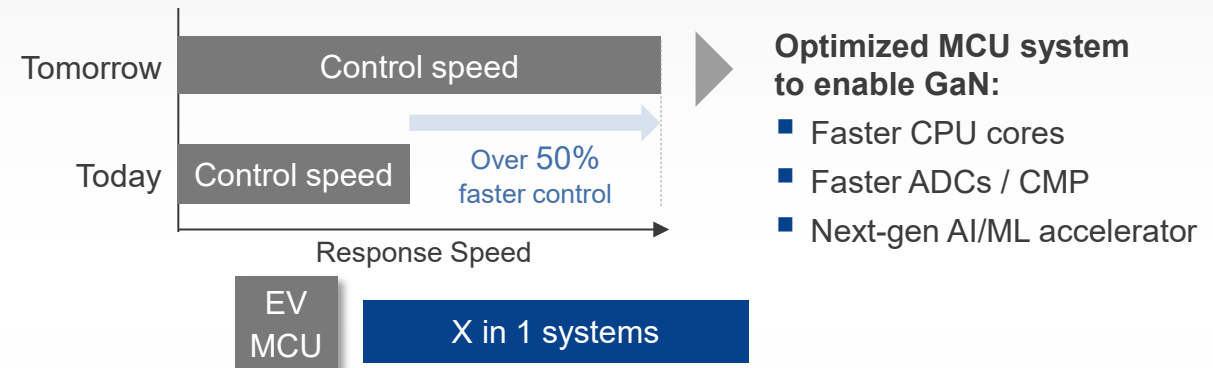
### Success story

- U2x Series adopted by top OEMs worldwide, driving the shift to 28nm technology

## Why we continue to win tomorrow

### Optimized EV MCU platform

- Enables scalable X-in-1 Integration



### Stronger execution in regions

- Deep local ecosystem partnerships across OEMs, Tier1s, SW/HW partners
- Early engagement → Fast design win execution  
Closely aligned with fast design cycles in China

# SUMMARY



## SDV adoption and market trends

Renesas journey addresses system needs of the future

## Expanding to true vertical partner for OEMs

Transformation from a reputable semiconductor supplier to fully integrated system provider

## Expanding SDV investments (software, tools, stacks and know-how)

Accelerate footprint in automotive & adjacent markets (Physical AI, Robotics ...)

## Empowering SDV through unified HPC, Zonal & Power Ecosystem

Foundational focus to deliver efficient system for compute, power, analog (incl. Renesas 365)

**RENEASAS**

THANK YOU

## (FORWARD-LOOKING STATEMENTS)

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